

REMARKS

Claims 1-36 were pending. Claims 1-19 were withdrawn due to restriction and are canceled herein. Thus, claims 20-36 are now pending. The applicants respectfully request reconsideration and allowance of this application in view of the above amendments and the following remarks.

The applicants appreciate the acknowledgement of the claim for priority under section 119 and the notice that the certified copy of the priority document has been received.

The applicants further appreciate receiving an initialed copy of the form PTO-1449 submitted with the Information Disclosure Statement filed on January 20, 2005.

Claims 32 and 36 were rejected under 35 USC 112, second paragraph, as being allegedly indefinite. The applicants respectfully request that this rejection be withdrawn for the following reasons.

With regard to claim 32, the Examiner has alleged that the feature of a film thickness direction lacks antecedent basis. Since the film thickness direction is being recited for the first time using a definite article, applicants are unclear why antecedent basis is necessary. It would be clear to one of ordinary skill that the impurity concentration distribution has a chevron shape in a film thickness direction. However, without acknowledging the propriety of the rejection, claim 32 is amended herein for clarity to include that the film thickness direction is perpendicular to the substrate.

Claim 36 has been amended herein to add the feature of, *inter alia*, forming an epitaxial layer on the substrate. The added features provides antecedent basis for the claimed epitaxial layer to address the grounds of rejection. Accordingly, the rejection should be reconsidered and withdrawn.

Claims 20-22 and 28-31 stand rejected under 35 USC 102(b) as being anticipated by MacDonald et al., U.S. Patent No. 5,628,917 (hereinafter "MacDonald"). The applicants respectfully request that this rejection be withdrawn for the following reasons.

In claim 20, as amended, the semiconductor wall is integrated with the substrate after the step of etching the semiconductor substrate to form the trenches and the semiconductor wall. Further, the substrate is thermally oxidized so that the semiconductor wall is transformed into a semiconductor oxide wall and the trench is filled with semiconductor oxide as noted in the Office Action in col. 5, lines 52-58 and col. 7 lines lines 35-42 and Figs 5b and 7b of MacDonald.

Applicants note that in MacDonald, a block structure having a thermal SiO₂ structure and a silicon layer sandwiched between the thermal SiO₂ structure is thermally oxidized so that the block structure becomes a SiO₂ block. In such a case, the initial block structure is separated from the substrate, as shown in Fig. 7a and the formed SiO₂ block is also separated from the substrate (Figs. 7a and 7b, column 7, lines 56-61).

Thus, MacDonald fails to disclose that the optical part is integrally formed with the substrate. MacDonald further fails to disclose that the substrate is thermally oxidized under the condition that the bottom of the semiconductor wall is integrated with the substrate.

It is important to note that a construction around the optical device allows for the stable formation of the optical device. Specifically, the substrate is heated up to around 1000°C to form thermal oxidation. Then, the substrate is cooled down to room temperature. In a temperature-decreasing portion of the thermal oxidation, a stress is applied to the SiO₂ layer, the stress being the result of thermal contraction. Initially during the temperature-decreasing portion, the SiO₂ layer is mechanically flexible, and the SiO₂ layer has a thin elongated plate shape. If a stress is

applied to the SiO₂ layer when it is mechanically flexible, the shape of the SiO₂ layer is easily deformed. Thus, in accordance with the teachings of MacDonald, it would be difficult to form the SiO₂ block shown in Fig. 7b, in which neighboring two SiO₂ layers are bonded together using the claimed method.

In stark contrast, in claim 20 as amended, during the temperature-decreasing step, the SiO₂ layer, i.e., the semiconductor oxide wall, is integrated with the substrate. Specifically, the bottom of the semiconductor oxide wall is integrated with the surface of the substrate along with a longitudinal direction of the wall so that the bottom of the wall functions as a fixed end. Thus, the mechanical strength of the semiconductor oxide wall is sufficiently secured, so that the optical device, in which neighboring two semiconductor oxide walls are sufficiently bonded together, is formed.

Claims 34-35 stand rejected under 35 USC 103(a) as being unpatentable over MacDonald in view of Strain, U.S. Patent No. 4,585,299. The applicants respectfully request that this rejection be withdrawn for the following reasons.

Claims 34-35, by virtue of depending from claim 20, are allowable for at least the reasons set forth herein above with regard to claim 20. It is respectfully requested that the rejection of claims 34 and 35 be reconsidered and withdrawn.

The indication of allowability with regard to claims 23-27, 32, 33 and 36 is noted with appreciation. Claims 23, 24 and 32 have been rewritten in independent form to include the features of the base claim and intervening claims and are therefore allowable. Claims 25-27 and 36, by virtue of depending from claim 24, are allowable. Claims 33, by virtue of depending from claim 32 is allowable.

In view of the foregoing, the applicants submit that this application is in condition for allowance. A timely notice to that effect is respectfully requested. If questions relating to patentability remain, the examiner is invited to contact the undersigned by telephone.

If there are any problems with the payment of fees, please charge any underpayments and credit any overpayments to Deposit Account No. 50-1147.

Respectfully submitted,



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